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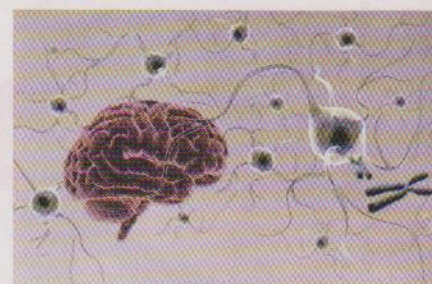
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Electron micrograph of *Mycoplasma mycoides* JCVI-syn1.0 cells (magnification ~25,000×). These cells were produced following transplantation of a 1.08-megabase pair synthetic *M. mycoides* genome into *M. capricolum* recipient cells. The cells are controlled by the synthetic genome, exhibit the expected phenotypic properties, and are capable of self-replication, thus providing proof of principle for the production of cells from digitized sequence information. See page 52.

*Photo: Thomas Deerinck and Mark Ellisman, National Center for Microscopy and Imaging Research, University of California at San Diego*

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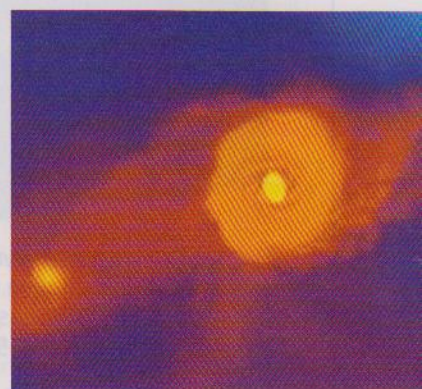
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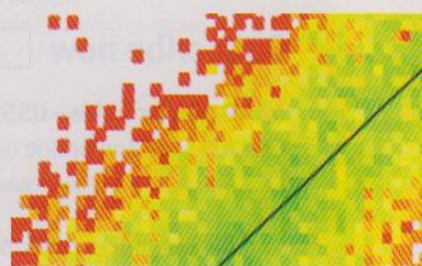
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## SCIENCEONLINE

## SCIENCEEXPRESS

[www.sciencexpress.org](http://www.sciencexpress.org)

**Peripheral Protein Quality Control Removes Unfolded CFTR from the Plasma Membrane**  
T. Ojayedo et al.

Cells clear misfolded and damaged proteins from the cell surface, sometimes frustrating attempts to treat protein-folding diseases.  
10.1126/science.1191542

**Genetic Signatures of Exceptional Longevity in Humans**

P. Sebastiani et al.  
Centenarians have genetic signatures that distinguish them from random individuals but are themselves genetically diverse.  
10.1126/science.1190532

>> Science Podcast

**Muscle Dysfunction Caused by a  $K_{ATP}$  Channel Mutation in Neonatal Diabetes Is Neuronal in Origin**

R. H. Clark et al.  
Identification of the origin of muscle weakness that accompanies a form of neonatal diabetes may lead to safer therapies.  
10.1126/science.1186146

**Functional Modules and Structural Basis of Conformational Coupling in Mitochondrial Complex I**

C. Hunte et al.  
A long helix transduces conformational energy to the proton-pumping elements in complex I.  
10.1126/science.1191046

**Ultrahigh Porosity in Metal-Organic Frameworks**

H. Furukawa et al.  
The large surface areas of these materials would correspond to that of dispersed nanocubes just 3 to 6 nanometers wide.  
10.1126/science.1192160

**Single-Shot Readout of a Single Nuclear Spin**

P. Neumann et al.  
The quantum state of a single nitrogen vacancy in diamond can be read out nondestructively in a single-shot measurement.  
10.1126/science.1189075

## SCIENCENOW

[www.sciencenow.org](http://www.sciencenow.org)

Highlights From Our Daily News Coverage

**'Altitude Doping' Has Its Limits**

Athletes who spend too long at high elevation to gain a competitive advantage may be hurting their performance.

**Earth-Like Planets May Be Shielded From Solar Scorching**

Simulation finds that M dwarf stars will not destroy the atmospheres of habitable worlds.

**Bats and Wallabies Have a Lot of NIRV**

"Fossil" genes from the Ebola family of viruses found in a wide range of mammals reveal pathogens' ancient origins.

## SCIENCE SIGNALING

[www.sciencesignaling.org](http://www.sciencesignaling.org)

The Signal Transduction Knowledge Environment

## EVOLUTION OF SIGNALING SYSTEMS

## EDITORIAL GUIDE: Focus Issue—

## The Evolution of Complexity

N. R. Gough and W. Wong

With the wealth of data in genomics and proteomics, scientists can begin to investigate how signaling systems evolved.

**RESEARCH ARTICLE: Evolution of the TSC1/TSC2-TOR Signaling Pathway**  
J. Serfontein et al.

## PODCAST

C. J. Howe and A. M. VanHook

Analysis of TOR signaling pathway evolution may shed light on the early divergence of eukaryotic lineages.

**RESEARCH ARTICLE: Origins and Diversification of a Complex Signal Transduction System in Prokaryotes**  
K. Wuichet and I. B. Zhulin

**PERSPECTIVE: The Promise of Evolutionary Systems Biology—Lessons from Bacterial Chemotaxis**

O. S. Soyer

Genomic analysis reveals missing links in the evolution of chemotaxis systems.

**NETWATCH: Understanding Evolution for Teachers**  
Teach and learn evolutionary concepts with materials appropriate for K-12 students; in Educator Sites.

## SCIENCE CAREERS

[www.sciencereers.org/career\\_magazine](http://www.sciencereers.org/career_magazine)

Free Career Resources for Scientists

**Charting Relationships in an Unseen World**

S. Carpenter

Metagenomics research probes how complex microbial communities function.

**Scoring a Career in Sports Science**

K. Travis

Three scientists talk about their careers in sports-related science.

**Science Careers Communities**

Science Careers Staff

MySciNet and CTSiNet offer opportunities to connect with like-minded scientists.

## SCIENCE TRANSLATIONAL MEDICINE

[www.sciencetranslationalmedicine.org](http://www.sciencetranslationalmedicine.org)

Integrating Medicine and Science

**EDITORIAL: Qualifying Therapeutic Discovery Project Tax Credit**

V. E. Boegh and G. L. Hecimovich

## PODCAST

V. E. Boegh et al.

Small life sciences companies can earn tax credits for research and development or exchange these credits for grants.

**COMMENTARY: Offering Individual Genetic Research Results—Context Matters**

L. M. Beskow and W. Burke

A "one size fits all" threshold cannot be developed for decisions about return of individual results.

**RESEARCH ARTICLE: Genomic Architecture Characterizes Tumor Progression Paths and Fate in Breast Cancer Patients**

H. G. Russnes et al.

**PERSPECTIVE: Translating the Genomic Architecture of Breast Cancer into Clinical Applications**

H. M. Horlings et al.

An objective score of structural alterations in tumor chromosomes gives prognostic information about breast cancer.

**RESEARCH ARTICLE: Serotonergic Neurons Mediate Dyskinesia Side Effects in Parkinson's Patients with Neural Transplants**

M. Politis et al.

A serotonin receptor agonist reduces the involuntary movements that can result from cell-based therapies for Parkinson's disease.

## SCIENCEPODCAST

[www.sciencemag.org/multimedia/podcast](http://www.sciencemag.org/multimedia/podcast)

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Download the 2 July Science Podcast to hear about genetic signatures of long life, biosecurity and ethical concerns about synthetic biology, behavioral epigenetics, and more.

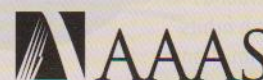
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[news.sciencemag.org/scienceinsider](http://news.sciencemag.org/scienceinsider)

Science Policy News and Analysis

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